



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/450,364	11/29/1999	LUIS FELIPE CABRERA	777.246US1	7529
7590	05/20/2004		EXAMINER	
Homer L. Knearl MERCHANT & GOULD P.C. P.O. Box 2903 Minneapolis, MN 55402-0903			ANYA, CHARLES E	
			ART UNIT	PAPER NUMBER
			2126	
DATE MAILED: 05/20/2004				

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/450,364	CABRERA ET AL.	
	Examiner	Art Unit	
	Charles E Anya	2126	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3/MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 25 February 2004.

2a) This action is FINAL. 2b) This action is non-final.

3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-22 and 29-36 is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) Claim(s) _____ is/are allowed.

6) Claim(s) 1-22,29-36 is/are rejected.

7) Claim(s) _____ is/are objected to.

8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.

10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) All b) Some * c) None of:

1. Certified copies of the priority documents have been received.
2. Certified copies of the priority documents have been received in Application No. _____.
3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)	4) <input type="checkbox"/> Interview Summary (PTO-413)
2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)	Paper No(s)/Mail Date. _____.
3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.	5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152)
	6) <input type="checkbox"/> Other: _____.

DETAILED ACTION

1. Claims 1-22 and 29-36 are pending in this application.

Claim Objections

2. **Claim 8 is objected to because of the following informalities:**
3. Claim 8 seems to include typographical error. For the purpose of this office action the examiner would insert the phrase "the" after "issues" on line 2.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

4. **Claims 4 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.**

5. Claim 4 recites the limitation "the access pattern" in line 1. There is insufficient antecedent basis for this limitation in the claim.

For the purpose of this office action the examiner would assume that the phrase "the access pattern" implies "the intended input/output patterns for accessing the logical volume".

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

7. **Claims 1-14,16-22 and 29-36 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,289,375 B1 to Knight et al. in view of U.S. Pat. No. 5,408,644 to Schneider et al.**

8. As to claim 1, Knight teaches a volume provider that presents an application programming interface (API) to applications on the computer (Local Library 1001 Col. 18 Ln. 15 – 54), the API for receiving first desired behavioral attributes of the logical storage volume (Col. 29 Ln. 54 – 67, Col. 30 Ln 40 – 63), and wherein the volume provider maps the logical storage volume based on first desired behavioral attributes received from a first application (“Refresh” procedure) and second desired behavioral attributes previously received via the API from a second application (“Discover” procedure) (Step 1911 Col. 40 Ln. 25 – 42).

9. Knight is silent a storage management system on a computer comprising a volume provider to map a logical storage volume onto one or more storage devices of a storage subsystem.

10. Schneider teaches a storage management system on a computer comprising a volume provider to map a logical storage volume onto one or more storage devices of a storage subsystem (figure 2 Col. Ln. 19 – 39).

11. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Schneider and Knight because the teaching of Schneider would improve the system of Knight by providing a means for examining and organizing logical requests into physical requests (Col. 13 Ln. 19 – 39).

12. As to claim 2, Schneider teaches the storage management system of claim 1 wherein the first desired behavioral attributes includes data availability desires including a desired level of fault tolerance (figure 7A Col. 14 Ln. 21 – 37).

13. As to claim 3, Knight teaches the storage management system of claim 1 wherein the first desired behavioral attributes include intended input/output patterns for accessing the logical storage volume (figure 9E Col. 17 Ln. 5 – 33).

14. As to claim 4, Knight teaches the storage management system of claim 3 wherein the intended input/output patterns for accessing the logical volume indicate whether the volume is primarily intended for sequential reads and sequential writes (figure 9E Col. 17 Ln. 5 – 33).

Art Unit: 2126

15. As to claim 5, Knight teaches the storage management system of claim 1 wherein the first desired behavioral attributes include optimization preferences (figure 9E Col. 17 Ln. 5 – 33).

16. As to claim 6, Knight teaches the storage management system of claim 1 wherein the volume provider resolves conflicts between the first desired behavioral attributes and the second desired behavioral attributes (Col. 29 Ln. 54 – 67, Col. 30 Ln 40 – 63, Step 1911 Col. 40 Ln. 25 – 42).

17. As to claim 7, although Knight is not explicit with reference to the storage management system of claim 1, wherein the first and second applications have no knowledge of the physical characteristics of the one or more storage devices of the storage subsystem, Knight teaches a manager (client) that uses "Refresh" and "Discover" procedures (first and second applications) via an agent/local library (volume provider) to communicate with storage/physical devices thus providing an agent/local library that shields the "Refresh" and "Discover" procedures (first and second applications) from the storage/physical devices

18. As to claim 8, Knight teaches the storage management system of claim 7 wherein the second application is an administrative tool that issues the second desired behavioral attributes to the volume provider in response to input from an administrator ("Discover" procedure Col. 29 Ln. 54 – 67, Col. 30 Ln. 40 – 63, Col. 40 Ln. 25 – 35).

19. As to claim 9, Knight teaches the storage management system of claim 3 wherein the volume provider monitors actual access patterns and reconfigures the volume in response to changes in the actual access patterns and the intended input/output patterns for accessing the logical volume (Col. 29 Ln. 54 – 67, Col. 30 Ln. 40 – 63, figure 19 (Step 1911) Col. 40 Ln. 25 – 60).

20. As to claim 10, Knight does not explicitly teach the storage management system of claim 1, wherein the API conforms to a Component Object Model (COM) interface however, Knight does teach implementing the system in a programming language that includes object-oriented language (Col. 9 Ln. 55 – 67). Being an object-oriented language, COM can therefore be used to implement the application programming interface of Knight.

21. As to claim 11, Knight teaches a method for managing one or more storage volumes of a storage subsystem by a computer (Col. 12 Ln. 28 – 41) comprising: receiving via an application programming interface (API) presented by a volume provider to applications on the computer (Local Library 1001 Col. 18 Ln. 15 – 54), first storage access information that characterizes desired volume behavioral attributes of one or more storage volumes from a first application (Col. 14 Ln. 28 – 46, figure 9E Col. 17 Ln. 5 – 33, Col. 19 Ln. 47 – 67, figure 11 Col. 20 Ln. 1 – 30), receiving, from a second application via the API, second access information that characterizes desired

volume behavioral attributes of one or more storage volumes (Col. 29 Ln. 54 – 67, Col. 30 Ln. 40 – 63, figure 19 (Step 1911) Col. 40 Ln. 25 – 60) and configuring, by the volume provider, one or more storage volumes of the storage subsystem as a function of the first and second storage access information and physical characteristics of the storage subsystem (figure 19 (Step 1911) Col. 40 Ln. 25 – 60). Also see the rejection of claim 1 above.

22. As to claims 12-14, see the rejection of claims 2-4.

23. As to claim 16, see the rejection of claim 5.

24. As to claims 17,18,22 and 34, see the rejection of claim 9.

25. As to claims 19 and 32, see the rejection of claim 6.

26. As to claim 20, see the rejection of claim 10.

27. As to claims 21 and 31, see the rejection claim 11.

28. As to claim 29, see the rejection of claim 7.

29. As to claim 30, Knight as modified teaches the storage management system of claim 29, wherein the set of predefined behavioral attributes includes a fault tolerance attribute/a fast crash recovery required attribute (figure 7A Col. 14 Ln. 21 – 37), a removable attribute (Col. 45 Ln. 45 – 62), an optimize for sequential reads attribute/an optimize for sequential writes attribute/an optimize for mostly reads attribute/an optimal read size attribute/an optimal read alignment attribute/an optimal write size attribute/ an optimal write alignment attribute, (Col. 17 Ln. 5 – 33, Col. 20 Ln. 36 – 46) and rebuild priority attribute (Col. 45).

30. As to claim 33, Knight teaches the method of claim 31 further comprising: reporting to the first application an actual configuration of the logical volume (Col. 28 Ln. 22 – 28).

31. As to claim 35, Knight teaches the method of claim 31 wherein configuring comprising: storing configuration rules associating desired behavioral attributes with logical volume configurations based on the storage device physical characteristics (“...rule file...” Col. 13 Ln. 52 – 67) and configuring the logical volume based on the first and second desired behavioral attributes (Step 1911 Col. 40 Ln. 25 – 31), the configuration rules, and the storage device physical characteristics (Appendix C Col. 61 Ln. 40 – 67, Col. 62 Ln. 40 – 45).

32. As to claim 36, Knight the method of claim 31 further comprising: determining, by the first application, first desired behavioral attributes of the logical volume (Step 1911 Col. 40 Ln. 25 – 31).

33. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Pat. No. 6,289,375 B1 to Knight et al. in view of U.S. Pat. No. 5,408,644 to Schneider et al. as applied to claim 11 above, and further in view of U.S. Pat. No. 6,311,213 B1 to Dawson et al.

34. As to claim 15, Knight as modified is silent with reference to the method of claim 11 wherein receiving first storage access information includes receiving configuration parameters including a request size.

35. Dawson teaches the method of claim 11 wherein receiving first storage access information includes receiving configuration parameters including a request size (Col. 5 Ln. 52 – 67).

36. It would have been obvious to one of ordinary skill in the art at the time the invention was made to combine the teachings of Dawson and Knight because the teaching of Dawson would improve the system of Knight by providing means for backing up a specific sized data (Col. 5 Ln. 52 – 54).

Response to Arguments

37. Applicant's arguments with respect to claims 1-22 and 29-36 have been considered but are moot in view of the new ground(s) of rejection.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Charles E Anya whose telephone number is (703) 305-3411. The examiner can normally be reached on M-F (8:30-6:00) First Friday off.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, An Meng-Ai can be reached on (703) 305-9678. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Charles E Anya
Examiner
Art Unit 2126

cea.


MENG-AL T. AN
SUPERVISORY PATENT EXAMINER
TECHNOLOGY CENTER 2100